

WASHINGTON, D. C., SUNDAY MORNING, SEPTEMBER 24, 1916.

\$10,000,000 Armor Plant is Sought by Many Cities

THE last Congress directed the Secretary of the Navy to provide, either by erection or purchase of a factory, for the manufacture of armor plate for the navy. It must have an annual capacity of 20,000 tons and be located at a place or places approved by the general board of the navy, with especial reference to safety in times of war. Admiral Dewey is the presiding officer of this board.

Such a factory will cost at least \$10,000,000 to construct. When running at full capacity—and there will be for at least several years a demand for more than 20,000 tons of armor plate—will furnish employment to something over 1,500 men with a pay roll of at least \$1,500,000. It is, therefore, not surprising to see so many sections of the country striving to secure this prize, each for its own locality.

The Secretary has given opportunity to representatives of any place to present its claims as the logical location for the plant. And the cities and localities interested have not been at all backward in making the Secretary at his word. "Wires"—that mysterious and omnipotent power popularly supposed to lead to all throats—are being pulled, and pulled hard. Naval officers, members of Congress and others having even a vestige of authority are being buttonholed and importuned—particularly by those from "the provinces" who know not the ways of Washington. The race is a merry one. But underneath are the serious contentions and purpose of sound-thinking representatives of the various localities. And Washington is in the thick of the fight.

The reasons which will govern the board are extremely complex, but some of the principles do seem simple enough. The first is necessarily the military reason declared by Congress that it shall be "located with especial reference to safety in time of war."

"It would be difficult to find a place of safety in this country," if with a stronger army than the one the government now has available. That safe place certainly would not be near an unprotected part of the seacoast, for an enemy would undoubtedly make the arsenal, steel and machine factories its early objective, and, if successful, it would be of small moment whether somewhere in the interior the government maintained an armor plant.

"However, with the strengthening of the navy, time may be gained to mobilize an army, and then if our munition factories, docks and yards can be held, the preservation of an active armor plant will be of inestimable value in completing ships under construction somewhere in the interior, and in the tremendous effort which would follow when the nation took its defense with seriousness.

"The safety in time of war may therefore be considered from two points of view:—

ARMOR PLATE UNDER TREATMENT. IT HAS LOST ABOUT 150,000 POUNDS IN THE PROCESS.

—that of putting the armor plant so far west of the Atlantic that it will be beyond any but the most arduous campaign for land forces to reach and destroy it, or to put it near the coast, preferably on deep water, but so far from the coast line that it could not be reached by gunfire from an attacking fleet.

"Such a location as New York navy yard, however, great the other advantages of the place, would not be safe, for with modern long range fire a fleet might be able to reach it. Washington, Norfolk or Philadelphia, inaccessible from the ocean, are in this respect preferable to the waterside, which they are approached would be easily mined and a fleet could hardly force the shore batteries.

"The advantage of being on deep water is that the vessels could easily be taken to the factory to receive their armor, or it could be transported to the ship's home yard, which ever way the constructors found preferable.

"For other than military reasons, principles of economy, involving convenience, must govern the selection.

That place, it may be stated very generally, is most desirable which offers a good supply of labor, or raw material, fuel and easy transportation to the coast where it is to be used.

"With the present activity among steel manufacturers it will not be easy for the government, even with the attractions of its short hours, good pay, sick leave and vacations, to draw to it a sufficient number of skilled men. The great steel plants, which are maintaining armor plants as an incident, have men who have been raised there from their boyhood and know exactly what is expected of them. Many of them receive bonus pay with a bonus or a premium for extra work, and every man knows that if he effects any economy or makes any improvement in method of work he will be rewarded substantially.

"There is no doubt that the government can secure all the untrained employees it needs, and that there will be vigorous clamoring for appointments in the armor shops, but the quality of those men will be another question. If they are first-rate workmen, it is because they were trained in the big mills, and if they are not working there

it is because for some reason they are not satisfactory, or they themselves are not satisfied.

"The contestants for the location they represent is the right one to meet the requirements for safety in time of war, and then that they can offer 1,500 workmen, skilled to meet the requirements of making armor of the best quality, to operate with care the expensive and powerful machinery and to make no blunders which will spoil the daily output of steel.

"Fifteen hundred such men cannot be secured in any small place or sparsely settled country, for there must be such a number in the vicinity that it will be easy to fill vacancies; nor should the selected place be one where living expenses or other reasons make the prevailing pay for similar labor unduly high. Living conditions, the men and their families are a matter of consideration. Are there good schools, churches and other institutions? Is there comfortable housing for the people who work? Is the climate severe or depressing? Is the place healthy? Such questions must be answered favorably.

"Another factor that should count for the prize winner is that of fuel and

power. Vast amounts are required, but still more essential are convenience and economy in securing steel, not only the 'pig' from which the armor plates are made, but also the specially treated steel plates which will be required in naval construction.

"Congress acted wisely in leaving the location of the place to the general board, for it is best able to pass upon the question from the military point of safety in time of war, and that is the paramount thing for the real accomplishment of the purpose for which the plant is to be created, and by reason of their investigations—especially of the ordnance department—that body is well fitted from the economic point to make the selection. The donation of lands, promises of improvements and the like should have no weight against these claims.

"The three manufacturers of armor plate in the United States—Bethlehem, Carnegie and Midvale—have plants which can turn out about 30,000 tons of plate suitable for the side armor and turrets of dreadnaughts. For the two new battleships, New Mexico and California, authorized in 1915, it is safe to say, there will not be less weight of armor required than the Pennsylvania, which carries 7,132 tons on her sides and turrets.

"In the following year armor must be provided for four program battleships, which may be reasonably placed at 40,000 tons, besides four battle cruisers, to which may be added a mere guess, but a guess of 20,000 tons is conservative. To this add 30 per cent for faulty plates which must be discarded and for plates subjected to ballistic test or shell proving tests on the proving grounds, and it will be found that each superdreadnaught will require about 10,000 tons.

For the remaining program ships (two years), figured on the same basis, not less than 70,000 tons more will be required, so there will be plenty of work for the new factory, which cannot be made ready too soon.

"In the construction of a battleship, the barbettes and parts of the turrets are built in before the launchings, but the side armor is applied after the vessel is at the dock. The operation takes care and time.

"The thickness of the plates varies with the size and type of the vessel, and the difficulties of manufacture increase with the size and thickness of the plates. As is generally understood, the essential thing in armor is that it shall have a surface hardened to the last degree, to break up the projectile and prevent penetration, but if this process were continued throughout, the plate would become so brittle that it would shatter under impact.

"To prevent such a calamity the plate which may be a foot thick, is given the hard surface gradually by a process of depth, softening it to the back of the plate.

"A plant capable of turning out the annual 20,000 tons required by the Congress, according to the estimates of the committee appointed by Congress and reporting in 1915, will cost at least

\$10,000,000, depending somewhat upon its location, to construct.

Such a plant will occupy at least thirty acres of ground, and should have an office building for the administrative and drafting force. It must include drafting, blue print and photographic rooms. A separate building should be devoted to laboratories for chemical and physical work, including a microphotographic equipment. There will also be separate buildings for the storage of tools and of refractory brick, which are kept on hand to repair the open hearth furnaces.

There will be a carpenter shop, a blacksmith shop, a storehouse for general stock and a house for the locomotive and drafting force. It must include drafting, blue print and photographic rooms. A separate building should be devoted to laboratories for chemical and physical work, including a microphotographic equipment. There will also be separate buildings for the storage of tools and of refractory brick, which are kept on hand to repair the open hearth furnaces.

The steel will be converted into armor will be made in the open hearth plant from pig iron, scrap, nickel and other parts. The building will be fitted with moving cranes and will contain at least five open hearth furnaces and double that number of gas producers, besides two casting pits, in which the steel ingots will be cast. Here the ingots, some weighing over 32,000 pounds, are cast.

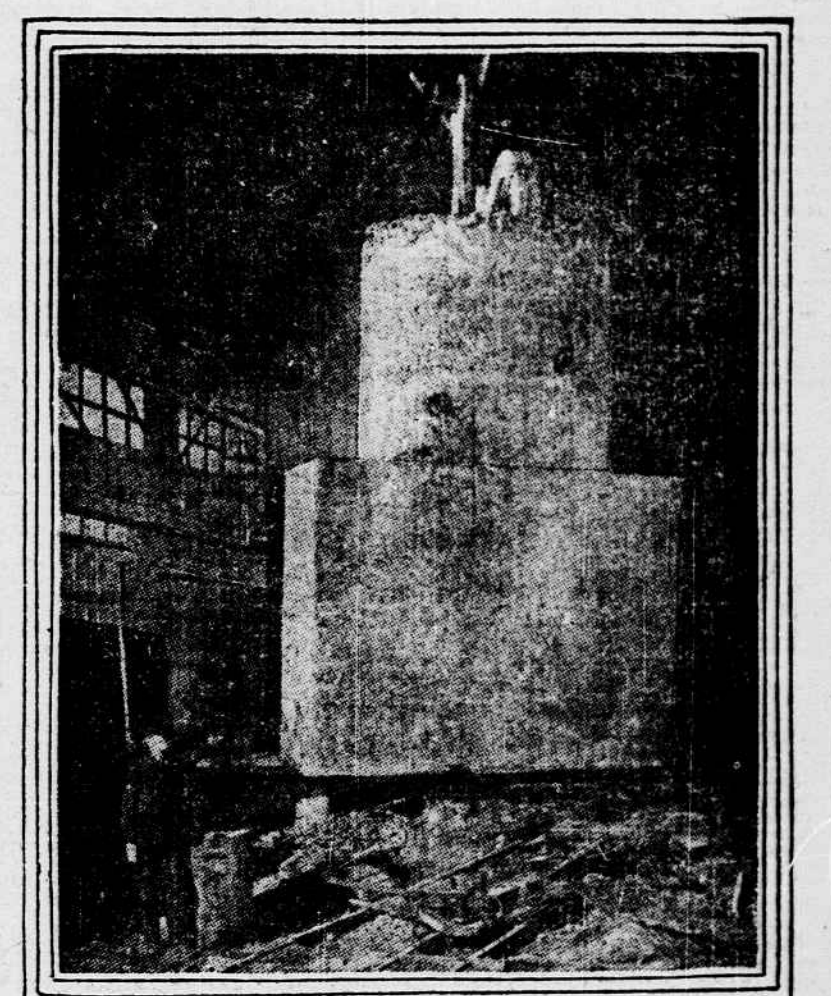
In the forging and bending shop will be located three or more fourteen-thousand-ton presses, which can forge and bend the heavy plates. A cementing and tempering room will be erected, where the armor plate will be annealed, heat-treated and water-hardened. It will bear notice that no visitors are allowed, and no descriptions are allowed. A machine shop will contain the machinery for finishing the plates and with traveling cranes to make their handling possible.

The weight of each plate, the size of the ingots and many operations to be conducted make necessary machinery and appliances of power and strength, bearing about the same relation to familiar machinery as a battleship to a tugboat. A machine shop will contain the machinery for finishing the plates and with traveling cranes to make their handling possible.

Owing to the great activities, caused by the European war, the station and steel plants throughout the country and the consequent advance in the cost of the raw materials, the estimates made nearly two years ago of the pay roll for the plant are probably lower than they would be if made at the present time.

When made, it was placed at \$1,388,000 annually, but distributed among 1,528 persons required to produce armor enough for two battleships a year.

By allowing 2 per cent, or \$220,000 a year, for repairs and general upkeep, the Navy Department administration or interest on investment, it was expected to produce the armor plate if the plant were operated the year around at full power, at the rate of \$250.11 a ton, which was made up of labor, \$71.92,



STEEL INGOT WEIGHING 32,000 POUNDS. THIS MASS IS REQUIRED TO MAKE A PLATE WEIGHING ABOUT FIFTY TONS. THE INGOT IS LIFTED BY A 150-TON CRANE.

metal \$107.14, repairs and maintenance \$40.72, maintenance of plant \$19.39. In producing the 20,000 tons of armor about 60,000 tons of ingots must be treated. The difference does not, however, represent a total loss, for a large part of it becomes scrap and is again reduced to ingots. All these result in the production of about two plates a day, each weighing on the average about thirty tons, although they vary greatly in size and shape, according to the part of the ship they are designed to protect.

Woman Scientist Puts Potato Through Its Paces

FOR a number of years past the United States Department of Agriculture has been studying the potato and scientifically selecting and breeding new varieties that will bring it up to the highest standard of efficiency in its duty to mankind. In its later efforts toward the improvement of the use of the potato, it has called in the assistance of a woman that she may bring her woman's knowledge of home economics to bear upon the study of the vegetable.

It is the province of Miss Margaret Connor, scientific assistant in pomology, the youngest woman scientist in the government employ, to put the potatoes through their paces from the standpoint of the home economist.

Potato growing on a large scale in the United States has been centralized in a dozen localities, corresponding roughly to the various geographical divisions of the country. This specialization has created a demand for varieties adapted to conditions in particular localities, or for varieties possessing certain desirable qualities, such as heat and drought resistance, resistance to parasitic fungi, early or late maturity, high starch content, etc.

The office of horticulture and pomology of the Department of Agriculture has carried on such investigations for a number of years, under the direct supervision of Prof. William Stuart, who has succeeded in developing a large number of seedling potatoes. These seedlings are crossed between known varieties whose character-

seedling must possess some very desirable cultural characteristics to save it from the discard.

"We make several tests of each seedling during the course of the winter and complete data are kept for each individual tuber. You know the composition of the potato changes slightly in storage, some of the starch being converted into sugar and the water evaporating. Have you ever noticed the sweet taste you often get in a potato late in winter? Its cooking qualities, therefore, vary slightly at different seasons of the year. The descriptions and measurements of each potato are kept on uniform cards.

"There are three general tests which we apply to each potato—boiling, baking and potato chips. The first two methods of cooking are the foundation of practically all the ways in which potatoes are served in the household. The latter is a method of commercial utilization which has been developed as a distinct industry as well as an important adjunct of delicatessen and bakery trade. If a potato will prove satisfactory when subjected to these three tests it is good for almost anything. It is used as a standard, the Green Mountain, one of the most satisfactory, all-round cooking varieties. Some of the seedlings grade higher in comparison, some lower.

"There are many more characteristics in a potato than the average person would believe. One with a disagreeable flavor or color is useless for most culinary purposes, and if a potato takes too long to cook it is held unprofitable. If it is lacking in the qualities of meanness when baked or boiled, it is of little general value and is so graded. The seedlings are graded the best potato chips, strange to say, potatoes which are starchy are well soaked out beforehand.

"A good salad potato should possess slightly different characteristics from one primarily intended for baking, mashing, etc. It should be firm and waxy in texture, with cohesive particles, so that the flesh may be cut into cubes without crumbling. Many of the large hotels and restaurants, before the war, imported foreign potatoes for salad purposes, the yellow, waxy flesh of these German and Holland varieties being well adapted to this method of preparation.

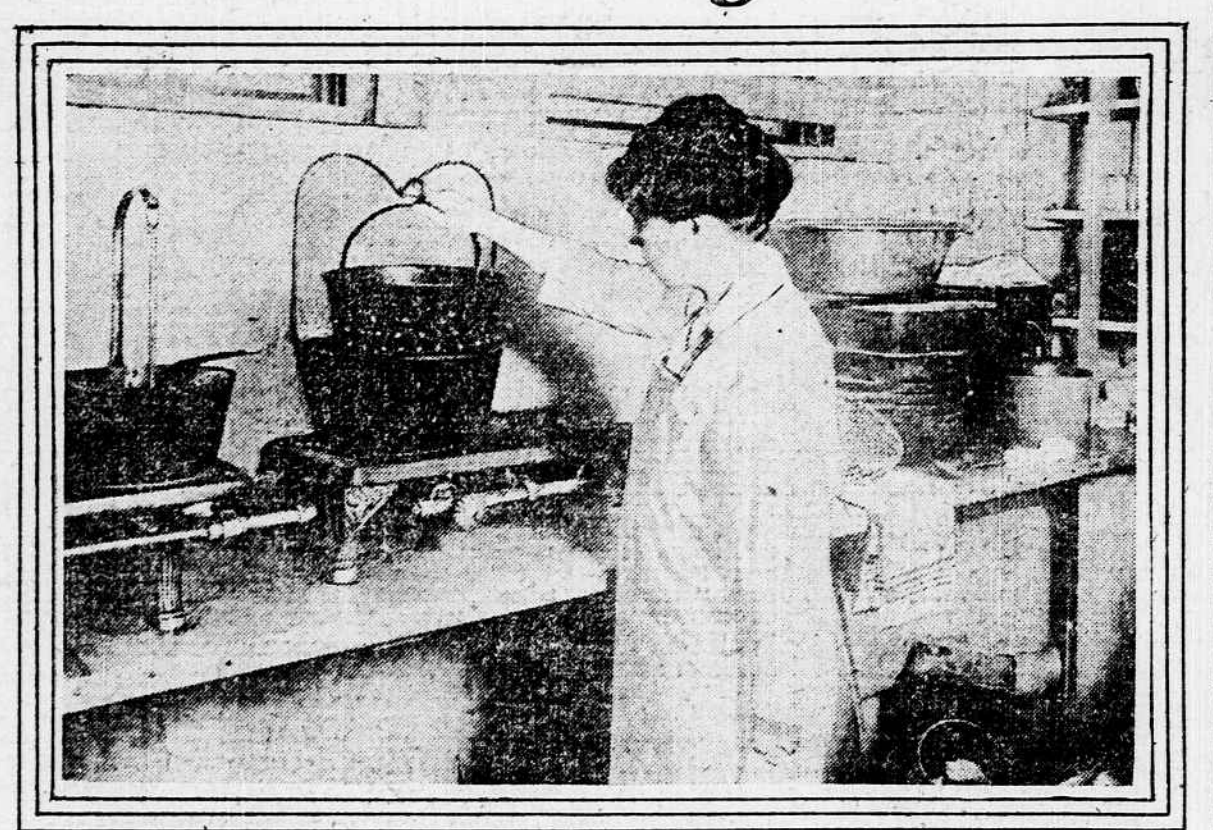
"One of Prof. Stuart's aims has been to breed an American variety which would possess the requisite salad characteristics, and a number of the seedling crosses between native and European or South American varieties have been developed with that end in view."

It was in her businesslike office on the fourth floor of one of the buildings which house the bureau of plant industry that Miss Connor received her interview. The latter, looking nervously for signs of culinary outfit, received an invitation to inspect the experimental laboratory of the potato expert.

The kitchen where Miss Connor makes her cooking tests is in the basement of the building, and is not at all unlike a well kept family kitchen. The large objects of interest are the electric oven, where the baking tests are carried on. This laboratory apparatus is provided with thermometer, which enables one to control the temperature over almost to a degree.

To make assurance doubly sure, however, there is a central oven thermometer as well, and with the aid of a little electric clock the oven temperature readings can be taken at any time through the glass window in front. By means of this central controlled equipment each seedling potato is given a uniform test.

"All the cooked potatoes are cooked at the same oven heat," explained the genius of this laboratory kitchen, "and the interior of each is allowed to reach the same temperature. This latter is determined by means of a small thermometer inserted into the center of each potato. There is, of course, a great difference in the length of time it takes different potatoes to cook, depending upon their size, shape, etc. The different seedlings show a great variation from standard, some being most unseasonal and requiring entirely too much time and heat."



MISS CONNOR AT WORK IN HER LABORATORY KITCHEN.

length of time it takes potatoes of uniform size, shape and variety to cook when the oven is too hot, or too cool, or just right. You would also be surprised at the difference in the amount of waste when cooked in a very slow oven as compared with a normal or with one too hot.

"One of Prof. Stuart's aims has been to breed an American variety which would possess the requisite salad characteristics, and a number of the seedling crosses between native and European or South American varieties have been developed with that end in view."

It was in her businesslike office on the fourth floor of one of the buildings which house the bureau of plant industry that Miss Connor received her interview. The latter, looking nervously for signs of culinary outfit, received an invitation to inspect the experimental laboratory of the potato expert.

The kitchen where Miss Connor makes her cooking tests is in the basement of the building, and is not at all unlike a well kept family kitchen. The large objects of interest are the electric oven, where the baking tests are carried on. This laboratory apparatus is provided with thermometer, which enables one to control the temperature over almost to a degree.

To make assurance doubly sure, however, there is a central oven thermometer as well, and with the aid of a little electric clock the oven temperature readings can be taken at any time through the glass window in front. By means of this central controlled equipment each seedling potato is given a uniform test.

"All the cooked potatoes are cooked at the same oven heat," explained the genius of this laboratory kitchen, "and the interior of each is allowed to reach the same temperature. This latter is determined by means of a small thermometer inserted into the center of each potato. There is, of course, a great difference in the length of time it takes different potatoes to cook, depending upon their size, shape, etc. The different seedlings show a great variation from standard, some being most unseasonal and requiring entirely too much time and heat."

"This last year I ran a series of experiments with one standard variety of potatoes, testing out the most desirable oven temperature for baking. There is a marked difference in the

in testing and grading the potatoes for their cooking qualities has given Miss Connor a new idea of the value of value in the field, and she is engaged for a time each year in taking crop notes.

"There are a vast number of notes to be made in the field," she said, "from the time the seed is planted in the early spring until the crop is harvested late in the fall. Our office is conducting a great many different experiments with potatoes, besides the breeding work, such as the value for seed of mature and immature potatoes; of different size seed pieces, of whole seed, or seed cut in halves, quarters, or according to ordinary field practice; of seed grown in different localities, of the value of different cultural practices, etc. All of these experiments entail much note-taking, descriptions of plants and tubers, records of weights and yields."

Miss Connor is a graduate of Cornell University, from which she gained the degree of B. A. a few years ago, and is now in the employ of the Department of Agriculture.

"We steam the potatoes in preference to boiling them directly in water," said Miss Connor. "The flavor is better preserved by steaming; a meaty potato will cook thoroughly without falling to pieces and it is in every way the better method. We also leave the jackets on. Much of the valuable protein and mineral matter lies directly under the skin, and the skin potato is pared this nutrient is lost."

A potato peeler, slicer and iron frying basket and pan comprise part of the equipment for the potato chip tests, and samples of the work looked temptingly golden and crisp.

"Quite a bit has been done along this line," said the mistress of the domain. "We have run potato chip tests with all of the seedlings as well as with many of the standard varieties of potatoes, and have tried many different oils and cooking compounds. The best potato chips are made with a high-grade vegetable cooking oil. I have made a number of visits to potato chip factories in the east to learn their methods of procedure on a large scale, and am trying to secure as complete a file as possible of firms making chips commercially and of their machinery and equipment, as well as of the methods of cooking compounds used."

"I describe and grade every potato myself, using different score cards for the different methods of preparation, but to fortify this individual estimate there is a judging committee of three, whose decisions are averaged and compared with mine before a final report is made."

standing very high in all her classes and winning the Phi Beta Kappa pin for distinction in her studies. Although she is yet a very young woman, she is deeply interested in the special scientific work she is efficiently accomplishing for the Department of Agriculture and for the community at large.

Shameless. MAJ. GEN. LEONARD WOOD said in a preparedness argument at a dinner in New York:

"The man who opposes preparedness expects his brother to do his fighting for him. This man is as shameless as the chap who said: 'Well, I'm going to get married next week.'"

"What will you live on—love?" asked a candid friend. "No," was the reply. "We'll live on the love's father."

Talking Machines
This Wonderful
WORCH Offer
GIVES YOU THE PRIVILEGE OF EXCHANGING
Your Old Piano
For a Victrola or Columbia Graphophone
If you cannot call, PHONE MAIN 1115 and our representative will call.
Hugo WORCH
1110 G. N.W.

"Neolin" Soles on School Shoes
Make Them Last Three Times as Long!

Mother and fathers, do you get the full force of that message?

Children's shoes soled with Neolin wear three times as long!

What is Neolin? It's a substitute made necessary by the extreme scarcity and high cost of sole leather. Said to be a composition of leather and rubber.

And it is claimed that it will outwear two to three pairs of the best leather soles—furthermore, "NEOLIN SOLES" have these admirable features:

Neolin soles are waterproof.
Neolin soles are light and flexible.
Neolin soles need no "breaking in."
Neolin soles are noiseless.
Neolin soles won't scratch floors.

So that they make THE IDEAL SCHOOL Shoes—and are a big offset to present advanced shoe prices.

We have NEOLIN-SOLED Shoes in some of our best makes—and announce a big demonstration and sale of them for this week.

Neolin-soled shoes in new "English" laced styles—tans and blacks:

For Boys and Girls, \$3 & \$3.50
For Young Ladies, \$4 to \$5
For Young Men, \$3 to \$5

Continuing Saturday's Offering of Women's New Fall Brown and Tan Boots At \$5.50

A FORTUNATE "pick-up" of the Last Word in NEW TAN and BROWN BOOTS—that saves the well dressed woman a full third of their present value. Four extremely fashionable models, in African Brown Kid and Rustic Calf. Laced Boots—eight inches high. With high or low heels—NEOLIN SOLES WITH WHITE TOP.

Other Splendid Headliners In Our "School and College" Sale

"RITE-FORMS" our famous Misses' and Children's Shoes, 25 years old in quality and comfort, but always BRAND-NEW in beauty and fashion. \$2 to \$3.50. Priced according to size.

New "English" Laced Boots for Misses and Children. Some extra high cut. Priced according to size:

In Black Calfskin.....\$2.25 to \$4
In Tan or Brown.....\$2.50 to \$5
Black, with Brown Tops.....\$3.50 to \$5
Patents, Tans or Browns.....\$2.50 to \$5
with white tops.....\$2.50 to \$5

At \$2.25 a Pair—New English Laced Boots of sturdy Gun Metal Calfskin. Boys' sizes, 1 to 5½. Girls' sizes, 8½ to 2.

At Our Busy "STOCKING SHOP"
NEW fall arrivals in Women's Novelty Silk Hosiery—and the Famous "SCHOOLPROOF" Children's Stockings.

McHahn & Co.
COR. 7th and K
1914-16 PA. AVE.
233 PA. AVE. S.E.

3 RELIABLE SHOE HOUSES

FOOT TROUBLES steadily get worse, if not corrected. Visit our FOOT COMFORT Dept. Consultation Free.